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ABSTRACT

In the development of assessment for elementary students, little attention has been paid to the information exchange between student and tester. Analysis of the learning exchange requires developmental, diagnostic, and process information. Cybernetic assessment, a departure from standard testing techniques, involves the examiner in the information exchange. To establish the importance of feedback between the learner and teacher, it is necessary to establish a diagnostic framework in which a two-way flow of information can be measured. The following are required for the development of such a cybernetic model: a clear feedback language, which is the function of the signal system; a methodology for developing a model of the learner's behaviors as they respond to the examiner's requirements - the function of the modeling system; a contingency structure which takes into account the changes which will occur in both instruction and solution as the learner/examiner interactions are modified - the function of the cuing system; and a way of comparing the data produced from an examination process with those derived from the learner's specific school behavior - the function of the standard test instruments and procedures. (DF)

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DON'T SAY ANYTHING, JUST HUG ME!

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DON'T SAY ANYTHING, JUST HUG ME!

"Say AH!" Ever since the first caveman peeled a stick and shoved it into a child's mouth, we have thought of testing in terms of a medical model. If only we could find out what's wrong, we could "do right". The only change we would have to make in the last sentence is, "If only we could figure out what's wrong, he could do "write" and maybe even "read," and we would have a thumb-nail history of school and reading - readiness testing for children in difficulty, over the past five decades.

When the world was young and we still believed in 19th century rationalism, it was easy enough to assume that Science, with a capital S, would teach us how to solve all problems. And Science, with a capital S, certainly applied to medicine and its off-shoots, psychology and learning. Currently, however, even the AMA would have to recognize that some corners of medicine have not yet yielded their mysteries to "the scientific method," and the clinical models we have derived from medicine and science have yet to tell us how children are to be taught.

What is more remarkable in the development of assessment for children is the limited amount of attention that has been paid to the exchange of information which takes place between child and tester, aside from the generation of standardized scores and criterion-based achievement data. The basic assumption of testing has been that the administrator of test procedures, whether it be medical practitioner, psychologist or educator, be removed, as much as possible, from the child's test-consciousness. In a real sense, the assumption has been made that if one is to examine a human organism and derive accurate data, then only the impact of the physical, and not the human, environment can be taken into account in the results. In keeping with the Heisenbergian principle, any changes wrought on the

environment by a controlling agent (i.e. tester) automatically showed the results in so far as "accurate data" were concerned. Unfortunately, the medical model, coupled with a sense of evaluation drawn from physics and the natural sciences, overlooked what should have been obvious. Organisms do not learn in isolation. On the contrary, if we accept the hypothesis that the basic building blocks of learning derive from an exchange of information between sender and receiver, then isolation is one of the truest ways of extinguishing both the ability and the desire to accumulate knowledge.

How then do we satisfy the objection that testing interaction does not allow for an identification of the learner's special problems while, at the same time, developing structures which generate assessment data that are measurable and can lead to special planning? The question is particularly critical where young children are involved, since much of their assessment deals with potential rather than current achievement. It is difficult to establish a standard reading score for a four year old, or even a first grader. After all, how much time have they had in a formal learning environment? Nevertheless, we recognize that some form of assessment would be helpful in developing teaching programs for even the youngest children. These teaching programs need not necessarily operate in the framework of a school or institution, for even parents can use the input presented through assessment which indicates the HOW of teaching children.

"WHAT'S THE DIFFERENCE - A TEST IS A TEST?"

Once assessment is viewed as an exchange between all the participants in a learning environment, it becomes critical to reformulate the assumptions we have made about testing procedures. Clearly, there is little point to a group of adults sitting around and watching a child push a pencil across a page, or point to a picture, or circle a number, or any of the other

devices used to record responses to standard instruments. Even if we assume that there is some benefit in watching children's behavior, this could be done just as easily through video-tape or film, and would at least have the virtue of allowing the adults to set their own time schedules. Therefore, there must be more than passive observation to justify the presence of parents, educators, etc., during the assessment process. Where the child is placed in a situation that involves more than one adult, the child too must recognize a function for each additional person in order to avoid the feeling of being an experimental animal under glass. Therefore, the assessment environment has to be viewed in terms of advocacy and feedback. In short, where standard test procedures can only justify the presence of adults who are as far removed from interaction as possible, the exploration of a child's learning environment requires the presence of all those who contribute to it and demands their direct participation, since that is usually what is happening when the child is trying to learn.

Of a more theoretical nature, but equally important, is the matter of the testing function itself. Where we deal with a medical model, the child is brought to a level of "frustration" or a plateau ("ceiling") so that we may determine a [present] learning cut-off point. As is frequently the case [when an adult deals with children] it is all too easy to assume that they are unaware of what has occurred, or perceive it only in unsophisticated terms. The fact is, however, that most children, regardless of their level of learning are aware when they reach a point beyond which they have difficulty functioning. When we deal with young children, whose knowledge of test scores and test procedures is rather limited, and whose ability to measure themselves against other individuals or abstract standards has not yet been developed, the cut-off point in a test is viewed in terms of failure. Testing

is one of the few truly egalitarian democratic processes. Bright or dull, advanced or retarded, every child is brought to a point of failure. And it does little good to assure the children that they are "functioning at expected levels", or "aren't expected to know these words yet", or "lots of kids your age have difficulty with this", etc. All children recognize PR [Public Relations] when they see or hear it. What they do know is that they missed the last six of eight items on the Peabody Picture Vocabulary Test, can't go on, and, therefore, have been left at a point of frustration.

The matter becomes bloody important when many of the adults who are important to the child are gathered under one roof. Now the child is not alone in recognizing a level of "incompetence". Everyone else shares the information as well. And yet we do have to find out something about how children operate; how they solve problems; how they process information; how open are their feedback channels; what strategies they select when confronted with new data; can they utilize recently acquired information in a process of new problem-solving; how efficient are their long and short term memories, etc

"But if we don't know what's wrong with the child [or how far the child can go], how can we "cure" him/her [or work with him/her]" -- and therein lies the assessment rub! Two critical assumptions are made about children and testing and adults and everything else. (1) All we need, in order to teach, is a symptom or a ceiling, and (2) Since we have a developmental line for all children, deviation from that line is a sign of "disorder", but it's O.K. because we have a large educational pharmacopoeia and somewhere on the shelves we'll find the pill. So we are led to two of the three assessment models most prevalent in our culture; the developmental model and the assessment model. The third is a communication, or cybernetic, model which will be discussed at some further point.

THE DEFICIT MODEL

There is a best way to teach History 3. If you don't think so, ask any publisher of History 3 texts. Luckily, publishing houses have consultants who are able to break that best way into a series of skills, and the really good consultants can add criteria to each of those skills, and the very top ones are also adept at measurement and have a sense of time. So now we find out which of those skills the children already have; which criteria should be applied to those they don't have; how much time is required to round out the children's baggage of skills; and how do we evaluate. And it's a good assessment approach. The problems is that it's predicated on the notion that there's a best way to teach History 3. But History 3 doesn't have to "learn anything". Johnny and Mary do, and for them, the best way to teach History 3 may be the worst way to teach Johnny and Mary.

THE DEVELOPMENTAL MODEL

We do have a developmental model, however, which tells us that if Johnny and Mary can't learn History 3 in the best way we have to teach History 3, then maybe they're just missing something. Now let's find out what it is. We have a vast technology; we [used to] have almost unlimited resources for younger children; we have lots of highly skilled professionals. All that combined: technology, money and brain-power are geared to helping Johnny and Mary, and if that's not enough, then we can even enlist the aid of the courts, medical profession, psychologists, parents, counselors. One way or another, we'll cure or correct the gaps in development. And that's not a bad model either, but now what? So far, we "know" why they aren't learning and what is needed to make them learn better, but we still don't know how to teach. WHY and WHAT are not sufficient without a HOW, and most of our test procedures don't tell us.

Even in this area, there have been many strides over the past 20 years or so. We have begun to recognize that while most organisms see, some hear better; and while most organisms hear, some touch better; and while most organisms touch, some see better. And we have begun to include the use of the senses as a HOW. We have also begun to recognize, even in the developmental model, that sequence is not necessarily tied to absolute time but only to order. So we allow some children to learn at their own pace, and we hope that the pace is dictated by organic, and not social or emotional causes. And we also have some theories about the chemistry which occurs between human beings, and we often try to fit the teacher and learner, and all these are healthy developments. But we still don't know how. A child may need hugs and squeezes, and may get hugs and squeezes, but how do you teach word attack skills, [if that's the problem], if hugs and squeezes don't have a phonic base? If a child needs structure we give structure, but how do you teach math, [if that's the problem], if the child doesn't understand arithmetic reasoning, or that math is a language; and if a child needs reinforcement we give reinforcement, but how do you teach the child a sense of pride in completed work if the child doesn't know the work is completed and thinks the reinforcement is for process rather than for exit?

Because, after all is said and done, neither the deficit nor the developmental model examine the exchange which takes place between teacher and learner; neither model truly examines human feedback systems; neither model allows for the unique learner whose forms of processing may be "out of sequence" or may require input which is not necessarily the best way to teach History 3.

THE COMMUNICATION, OR CYBERNETIC, MODEL

In light of the difficulties that almost every assessment theory encounters in dealing with process information, one is led inexorably to the conclusion that any assessment which is geared towards developing educational planning must take into account the interaction between learner and teacher, in addition to identifying procedures for specific kinds of materials and training methods to help shore-up various areas. Further, process assessment has one virtue lacking in general standardized tests. Namely, it is possible for the tester to participate fully, since the nature of the interaction is under examination and not the learner's "level". As a result, it is possbile to develop assessment instruments which take the learner to success rather than frustration and failure.

What then are the conditions necessary to develop cybernetic assessment models which can lead directly to planning?

First, the tasks involved must be open-ended, allowing the adult to identify exit at a point where the child has achieved success. For example, addition can flow from single, to multi-digit problems with the examiner prepared to extend the child's work into algebraic formulae where appropriate.

Second, the emphasis must be on the exchange which takes place between all of the parties in a given learning environment, rather than on a specific pre-identified level of achievement. Helping the child only underlines the necessary relationship between teacher and learner.

Third, the assessment structure must allow for a clarification of feedback channels prior to the actual work exchange. This involves setting up signal systems which are mutually understood.

Fourth, there must be options not only for the types of tasks presented, but for the manner in which the learner is expected to carry them out. The form of production may be oral, pencil and paper, typewriter, etc.

Fifth, the tasks must be so structured as to explore a variety of problem-solving strategies. This can be accomplished through a combination of tasks, some of which are amenable to multiple strategies and some of which explore single strategies.

Sixth, the tester must prepare a series of contingency clues to support the learner in moving towards success. It can be expected that the child will experience some difficulty with data level tasks, so the adults carry the obligation of developing clues which guarantee exit.

Seventh, feedback must allow the learner to express the method by which [the learner perceives] a task has been carried out. Children don't always see the world through our glasses. One child, when asked about a particular solution stated, "the card had a spot on it." All the cards had spots, but that was a clear perception on the part of the learner.

Eighth, the structure must be amenable to some form of numeric evaluation in order to show change over time.

Ninth, a communication, or cybernetic, assessment must be viewed as part of total assessment and not as an exclusive solution.

Flowing from the last condition, the administration of a full assessment battery, especially where it concerns children who are in learning difficulty, requires a thorough knowledge of the state of the art in the field and the ability to develop new tasks as the tester confronts each unique learner.

OPEN-ENDED TASK UNITS

The open-ended task units character of cybernetic assessment is perhaps the most important departure from standardized formats. The basic assumption is that each learning environment represents a unique exchange between two or more individuals which must be assessed in terms of a potentially-repetitive process. The valence is on the efficiency of the exchange, and not the level of achievement. What this means is that measurement must be derived from the ease or speed or lack of cues with which the learner progresses to successful completion of any given task. A set series of tasks, therefore, would severely limit the ability of the tester to select items which would be most helpful in the learning exchange. Although most standardized instruments do allow for a range or a sequence of tasks, it is usually based on an assumed relationship between grade placement and raw score. Even in the instruction the tester has no options but must begin and end in accordance with an established set of rules, whether time, number of errors, marking technique, etc. If those rules do not happen to fit the style of the teacher or the learner, the test scores may be seriously affected. If the simplest tasks on the test are still beyond the child's grasp, the tester has no option other than turn to a lower-level instrument. If the most difficult item is handled easily by the child, the tester cannot explore the interactions and stages necessary when a learner does reach a point of difficulty. The measures are comparative ones based on regional or national norms, but the person in assessment is non-standardized. Namely, how can <u>this</u> child be taught? If we are searching out the paths by which information is sent and received, then we cannot accept a point of frustration unless we can prove that we are dealing with a physiologically or neurologically damaged organism, which requires specific input mechanisms and procedures. At the other end,

we can also not assume that any learner, regardless of how gifted, will always resolve problems without some form of teaching input. The fact that a student scores at the top of a scale may be interesting, and even important, but it does little to help us structure a learning experience when the student needs it.

As a result, the cybernetic model requires the development of sequenced tasks of graduated difficulty, with entry and exit points optional, at the sensitivity or prior knowledge of the teacher-tester. No task evaluation can be too simple if we don't know the HOW to teach it, and no learner can be too competent if we can't support him at his own level of difficulty. The issue here is not to give first graders K-3rd grade tasks, and then determine where they score on a continuum. Rather, it is to present everyone with a range of tasks which guarantee easy success at the initial stages, and demand cooperative enterprise prior to exit.

While the involvement of the adult in the assessment procedure should be supportive, it is also necessary to guarantee a work interaction between the adult and the child. Part of the justification for putting the child through difficult procedures lies in the fact that the observers of the interaction (i.e. parents, specialists, school administrators, etc.) must be convinced that at least some of the tasks represent legitimate objectives, and are characteristic of long range goals for the child. Since the process has a planning, as well as an evaluative function, some of the work has to be drawn from curricular levels towards which the child will be moving. A second reason for including a high difficulty in the selection of tasks is that the interaction between adult and child should impact on the observers to the extent that they can leave with a feeling that, "I could do that with

Johnny." Removing part of the "magic" from the interaction between child and specialist, and recasting the relationship in terms of efficient exchange between sender and receiver of information must underline the entire procedure.

For many parents, the opportunity to participate is sufficient to break down the barriers erected by the "expertise" of the professionals. All the adults see the same interactions and are encouraged to react on their own levels of perception. While each of the adults may occupy a very specific role in the life of the child, there is no reason to assume that they can not share expertise as well as concern. Since the tester is demonstrating strategies for the child as well as eleciting information about the child's preferred working habits, there is, in effect, a sharing of information. The purpose, therefore, of a cybernetic assessment is not only feedback between child and testing adult, but feedback between all of the participants in the child's learning environment. As their feeling of competence grows, the efficiency with which they interact with the child must be enhanced. Specialists become facilitators, rather than monopolists insofar as teaching techniques are concerned.

ADULT ADVOCACY

In any model which involves exchange of information, a measure of its legitimacy must lie in the extent to which its procedures include input from all of the potential participants. From this point of view alone the assessment framework has to allow for observation and participation by all of the primary adults in the child's life. There is, however, an additional reason for including parents, teachers, specialists, administrators, etc. in this session.

For many children whose school and "pre-school" experience have included a high degree of failure, there is an expectation for low achievement which accompanies them through their school career. The literature on expectation indicates the heavy price society and individual children pay when they [the children] are expected to perform poorly. Even when adults assume that they can suppress their expectations and deal equitably with the children in their care, there is a self-fulfilling prophecy which may function in a superorganic way, marking not only the children's achievement but also the quality, and frequently the quantity, of interactions between child and adult.

What is most frightening about negative expectation is the impact it has on the advocacy of adults. While most of us have a general sense of commitment to the success of children, we also have our own professional egos which are expressed in the form of expertise concerning learners. It is not uncommon to hear teachers and other helping professional maintain that regardless of all other factors in their development, they "know children". This commitment to our own expertise is heavily expressed in our selection of children for success or failure. Indeed, some of the research literature indicates that teacher rankings are accurate to a significant degree in predicting children's success and failure. What is not clear is whether the ranking already serves to trigger the performance of children in relation to the degree of expectation involved. The Rosenthal and Jacobson study indicated that where teachers and other professionals have a negative expectation of a child's performance, they do not react well if the children achieve higher than their original identification. While they may recognize academic advances, there is a balancing feeling that something has happened to the children's social or emotional stability. It is almost as if there is

a necessity to reconfirm our "Knowledge" of children in terms of the original negative perception. What makes that condition so poignant is the difficulty, indicated by the literature, of reversing the established negative expectation.

The Dworkin dissertation [1974] demonstrated the possibility of reversing negative thrust through the use of a structured demonstration which involved all of the principals in a child's life. Although the function of the demonstration was to assess the strategies most useful in planning for the child, a good part of the procedure also was aimed at establishing an immediate advocacy for the child's success. Participants in the session were allowed to "get involved" and 'root for" the child. It is hard to avoid a cheering section when a youngster struggles through a difficult problem and emerges with success.

In a standard test framework we can not see or hear what a child is doing to arrive at a solution. In a cybernetic exchange, which lays an emphasis on the efficiency of information paths, the major focus of the observers is on the child's strategies rather than a final solution. Indeed, since the child is guaranteed success at every task attempted, there is very little point in worrying about the solution since ultimately it will be correct. The only two questions are: "What can we, as adults, do to be helpful to the child in arriving at appropriate solution?" and "What shifts take place between the energy expenditure of the child and the energy expenditure of the adult?"

The matter of energy expenditure is critical. Where a child can handle a problem with a minimum of teacher input, most of the energy requirements are on the child -- the child is doing most of the work and the teacher is doing most of the observing past the initial input stage. As tasks become

more difficult, however, the energy expenditure is placed on a see-saw. First, the child struggles with an answer, or even with the initial instructions; then the teacher struggles to interpret the child's difficulty and select appropriate strategies to ease the way toward solution; then the child picks the strategies which are perceived to be most helpful and tries to apply them; then the teacher interprets the results; then they both get off the "see-saw", having arrived at the solution together.

It is this exchange which adds an additional function to the non-testing participants in the assessment environment. Frequently, the act of teaching becomes such a magnet for our energies that we miss much of the interaction which takes place between ourselves and those we teach. We have found, in reviewing video-tapes of hundreds of hours of assessment sessions together with testers and the participating adults, that whole blocks of time were hazy and could only be reconstructed with continued viewing. Words, gestures, and even complete sets of instructions went unremembered by the tester, although many of the other adults in the room could recall them with ease. Both by virtue of training and involvement, our focus is often on achievement and not process. Therefore, the participation of all the principals allows for an exchange both in and out of the assessment session, and that exchange deals as much with process as with outcome. The observer usually is able to point out "things" done by the tester that seemed to help. Such observations also trigger memories of interactions between each individual adult and the child which had similar positive effects, and thus we accumulate both advocacy statements and planning procedures base on identified past success.

Finally, participation means involvement, and not just observation. There have been many times in assessment sessions where one of the observers exchanged roles with the tester. The objective is always to search for those

strategies which are most helpful to the child on a given task. Just as teachers in the classroom may require the input of a colleague, the same is true in the assessment environment. And such positive intervention is also a piece of feedback information which relates to the most efficient ways that the child can interact with one or more adults in the learning environment.

In summary, the assessment environment requires the participation of as many of the critical adults as is possible. It encourages them to express a positive advocacy, to observe successful strategies, and to "step in" where they think they have something to contribute to the child's most successful outcomes. Many of the sessions we have administered and observed have ended with spontaneous applause for the performance of the child. It may not be "cool" in terms that we expect abstract testers to behave, but it sure makes the children and adults feel good. One first grader, who had already built up a healthy history of failure, was so elated by the test experience that he walked around the room shaking everyone's hand, and then, after being theoretically returned to his class, kept on sticking his head into the room and smiling. Not only had the adults become his advocates, but even he bought into his own success.

SIGNAL SYSTEM

One of the assumptions most professional make is that they understand "feedback" and "reinforcement" behaviors necessary to keep children informed of their own progress and to offer appropriate affective support. Certainly, most parents and teachers would agree that knowledge of results* and frequent reinforcement are necessary to the well-being of a child. Unfortunately for many children who function in unexpected ways, our assumed reinforcers may offer either little, or incorrectly, perceived feedback.

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*as "feedback" is defined in the Psychological Abstract

While appropriate feedback channels are important for all children, they are doubly important for youngsters who risk-taking has been largely extinguished as a result of repeated failure. For those children new learning represents terror. They know before they start that they won't make it, and many of the messages we give them are open to misinterpretation. But a cardinal assumption of any assessment procedure must be clarity of information, whether we are using standardized or non-traditional instruments. Scores, measures, and even structured observations are meaningless if they're open to more than one interpretation. In an open-ended cybernetic model, where identification of information exchange is the primary objective, precision of such "feedback"* is an absolute necessity.

In our own practice we have found that it is possible to develop such an information exchange through the establishment of a signal system which is explicitly and clearly understood by all parties. Not only does such a signal system avoid misinterpretations on the part of both children and adults, but it has the additional virtue of providing diagnostic information which is not available in any other form.

Since the assessment process is unique to each combination of child and adults, the signal system and its dialogue cannot be standardized. What can be standardized, however, is the format through which it is established. Prior to beginning the assessment process, the tester introduces the child to all of the participants [almost all of whom he or she knows], and outlines the work which will be carried out in the next hour or so. Then the tester asks the child directly, "When you are getting something right, what would you like me to say or do?" In general, the responses have fallen into three categories:

- instant selection
- "I don't know"
- odd-ball

* not a static after effect of knowledge.

For many children the mere request is a revolution in their learning and testing relationship with adults. They have never been asked and they have never expressed a preference. It is also equally true that for many of them a simple feedback statement such as "very good" or "correct" is sufficient. Nevertheless the courtesy extended by the tester does make an impact not only on the children but on all of the observers, and the youngsters do select words or phrases which, for them, represent maximum reinforcers.

For the inarticulate children, the procedure is even more important. The fact that a child doesn't know, or has difficulty expressing a preference, doesn't mean that the preference doesn't exist, or that the need for courtesy is lessened. The tester then must become a catalyst in helping the child move toward a preferred feedback term, by suggesting a number of possibilities without giving valence to any of them. We have found that terms such as "Good", "Very Good", "Terrific", serve as triggers for [even] inarticulate children. Usually, they all agree to any of the first two choices, but if the tester continues to present options [up to five], the child will make a selection or even come up with an individual term.

Of most interest are those terms which also serve a diagnostic purpose. The inner language of children can be extremely revealing, but if you don't ask they won't tell you. The youngster who picked "HUG ME" told us volumes; the lonely boy who asked us to say "Hello" was reaching out for contact, and when the same child asked us to say "Anthony" [his name] during the second session, he was making a statement about emerging into a sense of self and wanting identification through his name; the child who asked for the signal "STOP" revealed something significant about his learning problems. He was a youngster who never recognized when he finished a problem, and assumed that teacher's statements such as "Very Good," etc. were ways of reinforcing

his process [i.e. "you're on the right track"], so he kept working and eventually abandoned what was correct. His "STOP" indicated, "Don't tell me I got it right -- tell me I got it finished." Many of the anecdotes and teacher stories emerge from the initial establishment of a positive signal because children not only say important things, but also funny ones and cute ones, and like that!

But what about the time when the child has not arrived at an approprite sclution and is having difficulty? Here, the tester assumes the burden of establishing the risk-taking signal. All sorts of formulae have been tried, but the one which seemed to work best was, "O.K." It has the virtue of abstraction without, at the same time, carrying any negative implications. Terms such as "Not Quite", and "Almost" represent problems in the structure we are outlining. "Not Quite" contains a negative term "(Not") and helps reinforce the children's notions of their own incompetence. The term "Almost" is non-descriptive of the children's actual problem-solving behaviors. Frequently these behaviors are far from "almost", and the use of such a term may convince children that everything is "con" if they know that they are in no way close to solution.

The tester explains to the child, before work is commenced, that the term "O.K" will be used whenever the child is experiencing difficulty, but then the tester will help until the child "gets it right". There are two cautions that must be addressed. First, most of us use the word "O.K." as a regular part of our speaking vocabulary. In the case of the assessment session, however, it is a signal to the child that he must continue working, and, therefore, it should only be used under those circumstances. Second, the children are likely to test until they feel that the "O.K." will be followed by supportive behavior on the part of the tester. Thus, the signal

system both for positive knowledge of results and risk-taking support must be used consistently and consciously. If we do not establish the signal in advance, most children will understand anyway. But those who don't are often the ones for whom assessment is most important in establishing future planning. Not only are all of the primary adults partners in the enterprise, the child is also a major stockholder and is entitled to a vote.

OUTPUT OPTIONS AND STRATEGIES

As with all other aspects of the assessment environment, the strategies through which the student will move towards completion and the output options by which solutions will be displayed must be kept open and flexible. All too frequently the difficulties children have result from the manner in which we expect them to produce solutions, rather than from the content of the lessons. Test frameworks certainly impose a relatively rigid output mode which many present youngsters with as many problems as does responding to the test items. Once again, if the objective of the assessment is to feed directly into planning, then it is as important to discuss how a child produces information as it is to discuss its accuracy.

In the assessment procedures, we have presented the material in three sequential strategy frameworks, each of which requires an increasing level of independent work by the child. The first strategy is where all materials and source data are within the visual field of the problem-solver, and where the solution does not call for any manipulation of the material, but only for identification. An example would be asking a child to identify specific symbols (triangle), words (cat) or phrases, when all of those symbols, words or phrases were already present and displayed together with the instructions.

The second strategy involves the use of inferential logic and requires the problem-solver to use previously known information to identify new information. Once again, all of the necessary information and material is present, but some manipulation is required since the child will have to eliminate what is known in order to identify what is unknown. In the example given above, a set of advanced mathematical symbols might be displayed together with circles and squares. The problem would be for the child to find the hexagons, for example, and the way the symbol would be identified would be by eliminating the known symbols (circles and squares).

The third strategy requires both manipulation and reformulation of material, but all problems are presented through established pattern so the problem-solver is relieved of the burden of figuring out the method of presentation and can concentrate on content. Continuing the example above, the child might be asked to make a hexagon, but would be provided with six straws of equal length and told that the ends must all be touching for the hexagon to be complete. The problem can then be extended to other more difficult shapes using a set number of straws and the same instruction.

The question of problem-solving options is somewhat more difficult. In many cases the nature of the problem determines the format in which it will be presented, thus, cutting down on some of the options. As a result, the selection of items for a communication, or cybernetic assessment procedure would become critical in order to preserve the maximum output flexibility.

We have recently been playing a parlour game with friends and colleagues in which we ask them to add a set of two digit numbers. There are always paper, pencils and a calculator available although the numbers are never so complex as to be beyond the scope of mental arithmetic. We have been amazed to find how many people reject the calculator and pencil and paper, and give

us a completely internalized answer. There are, of course, proponents of paper and pencil, and the calculator comrades. There is no intent to trick. Rather, to test out with adults, as well as children, the notion that we can not anticipate or assume the options that any individual will select for solving problems. In an assessment setting, therefore, especially one which is intended as a threshold for planning, these options must be available to the child. Maybe magnetic letters and numbers are a wonderful technique for young children, but some prefer talk and some prefer counting on their fingers, and some like to tick off five marks at a time, and all of them arrive at the solution for the problem 2 + 3 = 5.

What underlines the use of multiple stages for the same problem and available options for presentation of solution is the commitment to the HOW of teaching, which runs like a thread through the entire structure of the cybernetic assessment environment.

ESTABLISHING TEACHING MODELS

A number of the procedures used in constructing the assessment are selected especially because of their conversion to teaching models. Indeed, part of the underlying philosophy of the structure is that the assessment session itself is a direct form of teaching and that diagnosis and planning have a symbiotic relationship. It is clear that when the guarantee of the system is that children will succeed, the adults in that system have an obligation to prepare for those contingencies which seem to lead the problem-solver away from appropriate solution. Aside from the ethnic of the learning environment which requires that teacher and child be partners and not rivals, there is also the issue of conservation of human energy. Anyone who has ever stood in front of a class has felt the joy of a perfectly presented lesson: teacher and class as one; students' heads nod up and down

as each new idea emerges; EUREKA! smiles spread throughout the room; and there is a camaraderie that very few other social structures have in so large a measure. But when we miss the mark, it's as if the walls were closing in. We start to hunt for alternatives and the further we get from our initial presentation, the more desperate both we and our students become; "Won't this class ever end?" "Won't those kids ever understand?" "I've never had difficulty teaching this before!" And the feelings in the room are tangible and everybody is uncomfortable. And we have just spent a great deal of energy -- everybody, teacher, students struggle to find a key when we should have recognized from the very outset that lessons aren't always delivered or received the way they were originally conceived or planned. The real tragedy is that a few simple procedures might have helped avoid the discomfort and embarrassment of carrying an undelivered message. Every teaching interaction carries in it the seed of glory and the possibility of missing the mark, and we should prepare for the latter and redirect. The trouble is that when we first develop our lessons or our lectures or our presentations, we try to choose the words and images that are best for the given unit. If they miss, then we almost automatically have to turn to what we originally conceived of as lesser words and lesser images, and the further we get from our original selections, the less power we are likely to deliver. Of even more consequence is our search for a change in content on the assumption that our listeners are not equipped to deal with the material and, as responsible adults, we should not tax either their intelligence or their patience. Most learners have faced such a message at one time or another, and in a test situation, it is almost a built in condition. The learner reaches a point beyond which he can not deal deal with the material, and the message is clear.

How do we avoid both a wateful expenditure of our teaching energy and the demeaning message that the material we thought was suitable for a given group was above its collective head? We have found that the identification of a cueing sequence which becomes automatic to the teacher and learner serves as a support for those times when the selection of teaching approaches has missed the mark. Within the framework we'll identify below, each cueing level can be repeated as many times as the tester feels is necessary, but the sequence must be maintained.

The first cue is simple repetition. For many learners the problem is not the weight of the material or the complexity of the instruction, but a necessary time delay between the problem statement and the initiation of work on its solution. Anyone who has worked or lived with teenagers has experienced asking a question, having a teenager respond "Huh?" and then getting an answer in the midst of repeating the question. People require some transition from short to long term memory before they can start on problem-solving. Therefore, rather than searching for new ways of presenting material, the easiest and most energy-conservative approach is to repeat the problem as originally stated, with the option of changing some of the emphasis. If this pattern becomes repetitive during the assessment period it might suggest that in planning instruction for the child, directions be given twice, i.e. visually and orally, in two different formats on paper, etc.

If the first cueing level is insufficient, the second cueing level turns to isolation of part of the instruction without any change in the required solution. It's important when isolating part of the problem to avoid giving the learner the answer. Not only would such a step make it impossible to determine the operational behavior of the child (after all, the answer was given), but it would also rob the learner of the joy of independent discovery. Frequently, highlighting of a piece of the instruction is

sufficient to trigger initiation of problem solving behavior. In keeping with the general format of the assessment, isolation can be achieved through many options: by physically moving parts of the problem; by pointing and underlining; by color-coding; etc. We have found that almost all children are able to move toward solution with the aid of the second cueing level.

In those rare instances where a third cueing level is necessary, the teacher or tester must redefine the instruction and the solution, but never change the eventual outcome. If, for example, the kindergarten child who is asked to hand the tester four blue blocks, has difficulty with the task and finally requires the third cue, the blocks might be removed or added one at a time. Ultimately, however, the child's task is to deliver all four blocks (and not one or two because it's easier). The assessment should produce support for the child and not only information. Anytime we reduce the complexity of a requested solution, we remove support from the learner and put in its place pity. Empathy is a healthy characteristic for testers and teachers, but pity is destructive.

In using the cueing sequence, the demand is laid upon the tester to identify those behaviors on the part of the child which may lead to solution. That is, to establish solution models based on the child's own appropriate behavior -- even if that behavior constitutes only a portion of that which is required for total solution. Here, too, there are multiple reasons for model building. To begin with, there is the whole affective domain. Just as the signal system allows the child to select appropriate feedback terminology, the modeling system allows the learner to select appropriate problem-solving behavior. We have the option of either identifying what the child has gotten wrong or what he has gotten right. In either case, the

information is basically the same, but the affect is substantially different. A child who received 60% on a test could either see 4 items marked wrong or 6 items marked right. If there are six check marks on the page, then the child could correct the other four and eventually emerge with a perfect paper, but we can never erase X's.

But there are other even more tangible reasons for positive, rather than negative, results. The research of Kass and Zeman indicated that negative knowledge of results had two counterproductive outcomes. First, the learner tended to increase the rate of the error, and second, the learner tended to return to the same error time and again. If we examine our own behavior intuitively, we can find much substantiation for such a seemingly strange phenomenon. Frequently, children who have been on the receiving end of "helpful criticism" (they don't think it's helpful -- only the critics do) use the techniques which were pointed out to them as being incorrect, not out of stubbornness but because they only remember the event and not the specifics and, therefore, return to a technique which they hold in some residual memory. Establishing models of positive behavior based on the child's own problem-solving is a way of turning the tables.

Finally, the development of models always has mathematical implications in reducing the probability of error. On the simplest level, each part of the problem correctly resolved increases the probability of success on the next trial. If a problem has five parts and a child has solved one correctly, and has been shown a model of his/her own appropriate behavior, then the problem now only has four parts. The random probability for correct solution the first time is 20%, and rises to 25% on the second trial, a gross increase of 5% and a converted increase of 25%. Not only is the probability

for success increased, but the child has a way of initiating problem-solving the second time around with a sense of ease. If only we could retrace our steps every time we got lost and take the route that was given to us originally, there would be a lot fewer apologies to the hostess for being late to dinner parties.

The bonus effect of the modeling approach is that we have a chance to exercise the signal system between ourselves and the child -- even when total solution has not been achieved. Each time the child assays a solution, we have the opportunity to evaluate and identify a model of the child's appropriate behavior. No matter how small, use the agreed upon feedback terminology to indicate that behavior, and then select a cueing level through which a child can be helped to move towards solution. What should be noted is that the interlocking framework of the signal system, cueing level, and problem-solving model always return the child to the original problem. In that way the system guarantees success.

EVALUATION

Regardless of the assessment model, it must be possible to evaluate the effects of the interaction, to trace pre-post progress, and to feed directly into the planning. As far as measurement is concerned, each of the moves between learner and tester can be evaluated in terms of the number of cues required to move the child toward success. Regardless of the number of tasks involved, it is still possible to generate averages, time span, cueing interactions, etc. But children are also entitled to tell us how they would like to be taught, and how they think they arrived at a solution. Therefore, each successful task solution should be followed by the question, "How did you do it?" Children have given us strange answers or responded (with a shrug for the limited understanding of adults), "Cause that's what is is."

But no matter how strange, there was always a cue embedded in their solution. In effect, the communication, or cybernetic, assessment, begins and ends the same way -- with a simple question to the child which indicates both respect for the learner's input and a willingness to deal with information on a direct basis. We start by asking, "When you get it right, what would you like us to say?" and we end by asking, "You got it right. How did you do it?" It is this combination of informal perceptions together with the schooled observation of a child's actual learning which may unlock the whole world of planning.

BUT HOW ABOUT PRE-POST SCORES?

We are not suggesting that a good assessment framework by itself will answer all questions. We are still committed to identifying specific skills which will help the child; analyzing the language patterns by which children write or express their feelings and thoughts; measuring placement against standardized skill and achievement tests; making judgements on the basis of formal observation; and even identifying the learning pathology of children who have had a history of habitual failure.

What we do suggest, however, is that all of the above can only tell us WHY and WHAT, but not HOW. The bottom line of teaching is teaching, and that requires the HOW. And the HOW comes from information derived from interaction between adults and children, teachers and learners, senders and receivers. The learning environment is, above all, an information environment. We should know more about information in order to know more about teaching.

DON'T SAY ANYTHING, JUST HUG ME"

Summary:

This chapter focuses on two cardinal issues in assessment. One, the assumptions we make about the diagnostic process and the roles of examiner and learner, and two, the necessity of adding process information to the data derived from diagnostic and achievement instruments. There is no attempt to suggest that any one model can entirely replace the others. Rather, that an analysis of the learning exchange demands information from all three sources -- developmental, diagnostic, and process.

From our point of view, the most significant contribution of cybernetic assessment and its most serious departure from standard testing techniques lies in the involvement of the examiner in the information exchange. In order to establish the importance of feedback between the learner and supplier of information, it is necessary to establish a diagnostic framework in which a two way flow of information can be measured. Thus, the traditional structure which prevents the examiner from impacting on the learner must be changed in a manner which will allow for an opposite effect.

Developing a cybernetic model, therefore, requires a clear feedback language which is the function of the signal system; a methodology for developing a model of the learner's own behaviors as they are responsive to the requirements outlined by the examiner, which is the function of the modeling system; a contingency structure (cybernetic regulation) which takes into account the changes which will occur in both instruction and solution as the interactions between learner and examiner are modified, which is a function of the cueing system; and, finally, a way of comparing the data produced from an examination process with those data derived from the specific school behaviors of the learner, which is the function of the standard test instruments and procedures.

Ultimately, a cybernetic approach tends to emphasize positive behaviors since those behaviors are the ones most likely to produce successful problem-solving. While the intent of the approach is to allow for an examination of information exchange, the end result is to establish a test environment in which children and adults move towards success, and in which the participants need not feel threatened.

Our own field experience has indicated that where process is the point of emphasis, and where successful outcomes are guaranteed through signal and contingency systems, children experience a sense of joy, and adults a sense of advocacy which has profound effects on developing positive expectations.

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